A.3.4 Planetary Geology and Geophysics (PGG) Program

1. Scope of Program

The Planetary Geology and Geophysics (PGG) program supports scientific investigations of the planetary surfaces and interiors, satellites (including the Moon), satellite and ring systems, and smaller solar system bodies such as asteroids and comets. The goals of the PGG program are to foster the gathering, synthesis, analysis, and comparative study of data that will improve the understanding of the extent and influence of planetary geological and geophysical processes on the bodies of the solar system, the origin and evolution of the solar system, and the nature of Earth and its history in comparison with other planets.

The PGG program supports research investigations relevant to the scientific interpretation of data from past and existing planetary missions, as well as the science objectives of future missions. These investigations involve several types of research efforts such as, but not limited to: analysis and synthesis of existing data; theoretical and numerical modeling of data and processes; generation of new basic data in a laboratory environment; and combinations of these kinds of activities. Examples of the kinds of research supported by this program include:

- direct analysis of data from planetary missions;
- theoretical modeling of geologic and geophysical processes;
- photogeologic analysis and geologic interpretation of planetary surfaces;
- compositional and geologic mapping of planetary surfaces;
- laboratory and remote sensing studies;
- experimental studies of materials under conditions relevant to objects in the solar system;
- theoretical studies of the interiors of planetary bodies;
- the dynamical evolution of the planets, satellites, small solar-system bodies and ring systems; and
- geologic field studies of terrestrial analogs to planetary phenomena in the context of providing a better understanding of the planetary phenomena.

In addition, the program supports the development and production of cartographic products of planetary data sets. Proposals to study or develop flight instruments or study future planetary missions are beyond the scope of this program.

Proposed investigations of any planetary or satellite surface that are intended, as a by-product of the scientific research, to produce a geologic map suitable for publication by the U.S. Geological Survey (USGS) should check the relevant box on the *Cover Sheet* (see Section 5.3 of Appendix C) and clearly indicate this intention in the *Proposal Summary,* as well as the text of the proposal. Information on geologic maps that have been produced or are currently in production may be obtained from Dr. Kenneth Tanaka of the USGS at E-mail: <ktanaka@flagmail.wr.usgs.gov>.

Efforts to acquire observations of planetary surfaces and interiors may produce data of wide scientific interest. It is expected that these data sets would, after a reasonable amount of time, be archived within the Planetary Data System (PDS). Contact R. E. Arvidson (PDS Geoscience Node) for further information regarding the types of data sets that might be of interest for archiving purposes (E-mail: <arvidson@wunder.wustl.edu> or telephone: (314) 935-5609).

2. Experimental Facilities Available for the PGG Program

The following facilities are widely available to investigators supported by the PGG program, and, therefore, their use may be discussed in the submitted proposals (note especially the provisions for such discussion in the proposal section entitled *Facilities and Equipment*, in Section 5.3 of Appendix C).

• Planetary Aeolian Facility: The Planetary Aeolian Facility at NASA Ames Research Center consists of wind tunnels to simulate atmosphere-surface interactions on Earth, Mars, and Venus. For more information contact:

Dr. Ronald Greeley
Department of Geology
Arizona State University
Tempe, AZ 85287
Telephone: (602) 965-7029
Facsimile: (602) 965-8102
E-mail: greeley@asu.edu

• Reflectance Experiment Laboratory (RELAB): The RELAB facility at Brown University provides a mechanism for researchers to obtain laboratory spectra of geologic materials for use in compositional and/or geologic applications. The RELAB is supported by NASA as a multiuser spectroscopy facility, and laboratory time can be made available at no charge to investigators funded by NASA programs. For information on this facility and/or requests to receive a *RELAB User's Manual*, contact:

Dr. Carle M. Pieters
RELAB Science Manager
Department of Geological Sciences
Box 1846
Brown University
Providence, RI 02912
Telephone: (401) 863-2417
Facsimile: (401) 863-3978
E-mail: pieters@porter.geo.brown.edu

• NASA-Ames Vertical Gun Range (AVGR): The NASA AVGR is a national facility funded by the NASA Office of Space Sciences to enable investigations of impact

phenomena and processes. Exploratory or proof-of-concept programs requiring a limited number of experiments can be accommodated at no cost. More extensive programs are subject to review in order to assess feasibility and cost effectiveness. For more information, potential users of the AVGR should contact:

Dr. Peter Schultz
Department of Geological Sciences
Box 1846
Brown University
Providence, RI 02912
Telephone: (401) 863-2417
Facsimile: (401) 863-3978
E-mail:peter_schultz@brown.edu

3. Data Sources Available for the PGG Program

Prospective proposers should be aware of sources for data that might be used in their research and whether the required data are available. Useful contacts for making these determinations are given below:

• General Lunar and Planetary Information: The Lunar and Planetary Institute (LPI) is the most concentrated and readily accessible source of information in lunar science. Information about its services can be found on the LPI home page on the World Wide Web at URL <http://cass.jsc.nasa.gov/lpi.html>, and/or contact:

Director
The Lunar and Planetary Institute
3600 Bay Area Boulevard
Houston, TX 77058
Telephone: (713) 486-2180

• Data from Completed NASA Flight Programs: The National Space Science Data Center (NSSDC) stores digital and other data from completed flight experiments. Such data include: (1) lunar and planetary photographs, (2) digital planetary images, (3) data from numerous flight experiments, and (4) lunar cartographic products. Investigators are responsible for acquiring the data needed for their proposal. Modest requests for imaging and nonimaging data are free of charge, while charges are be made for large requests. Requests from U.S. investigators for data products and information may be made to:

National Space Science Data Center
Code 633.4
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, MD 20771
Telephone: (301) 286-6695

while requests from non-U.S. investigators for NSSDC data products and product availability information may be made to:

World Data Center A for Rockets and Satellites
Code 633
Goddard Space Flight Center
National Aeronautics and Space Administration
Greenbelt, MD 20771
USA
Telephone: (301) 286-6695

• Planetary Cartographic Products: A variety of planetary cartographic products such as topographic, orthophoto, geological, and other special maps and geodetic information are available. Requests from NASA-funded investigators for production of special maps or other cartographic materials will be accommodated when possible. Request available data or specific maps from:

Branch of Distribution
U.S. Geological Survey
Federal Center
Box 25286
Denver, CO 80225
Telephone: (303) 236-7477

Request information related to the availability of base maps and related materials or U.S. Geological Survey criteria for map publication from:

Branch of Astrogeology
U.S. Geological Survey
2255 North Gemini Drive
Flagstaff, AZ 86001
Telephone: (602) 556-7262

• Regional Planetary Image Facilities: Regional Planetary Image Facilities (RPIF's) contain nearly half a million images of the planets and their satellites taken both from Earth and manned and unmanned spacecraft, as well as topographic and geologic maps produced from these images. The RPIF's, located at institutions worldwide, are intended for use by individuals and groups who use photographic and cartographic materials of the planets and satellites in their research programs. These programs include geologic, photometric, colorimetric, photogrammetric, and atmospheric dynamical studies.

In addition to the local scientists and their associates who use these data on a daily basis, investigators throughout the world are encouraged to use the RPIF's. Send inquiries to the nearest facility in care of the Director, Regional Planetary Image Facility. Note that while these centers may be used for on-site study and selection of planetary and satellite images, they are not facilities for the production of photographs for users. Instead such

materials may be obtained from the NSSDC at the NASA Goddard Space Flight Center at the address given above. Additional information, including a listing of RPIF locations worldwide, can be found on the RPIF home page at URL <http://cass.jsc.nasa.gov/library/RPIF/RPIF.html>.

• Decalibrated Digital Planetary Image Data: Digital planetary image data are available through the discipline nodes of the Planetary Data System. Submit requests for imaging data and support documentation to:

Planetary Data System/Imaging Node
U.S. Geological Survey
2255 North Gemini Drive
Flagstaff, AZ 86001
Telephone: (602) 556-7262

while requests for other planetary geoscience data may be submitted to:

Planetary Data System/Geosciences Node
Washington University
Campus Box 1169
One Brookings Drive
St. Louis, MO 63130
Telephone: (314) 935-6652

4. Programmatic Information

Anticipated funding for this program is approximately $12.5M for FY 1999, which is expected to support approximately 150 investigations, including both new proposals and in-progress multiple year awards.

Holders of existing PGG multiple year awards (e.g., the second or third year of a three-year award from a previous NRA) must submit a request for an annual funding allotment of their award in the form of a *Progress Report* by the same deadline as given in Table 1 for new proposals for this program element. These *Progress Reports* will be screened by the peer review panel that will be reviewing new proposals to aid NASA's evaluation of progress. The Project Description in such a request for allotment, including a report of progress made during the past year, should be limited to no more than five single-spaced, typewritten pages and include a brief statement of planned work for the coming year, a report of progress made during the previous year, a budget, and an estimate of the amount of previously awarded funds that will remain available at the end of the award year. The five page limit does not include a *Cover Page*, a listing of proposal personnel, *Proposal Summary* (Abstract), *Budget Summary*, *Table of Contents*, references, figures, requests for equipment augmentations, detailed budgetary information, reprints, or appendices.

The schedules for submission of the Notice of Intent and proposal is given in Table 1 of the cover letter of this NRA. The World Wide Web site for submitting both the *Cover Page/Proposal Summary* (see Appendix C.5) is <http://cass.jsc.nasa.gov/panel/>; proposers without access to the Web or who experience difficulty in using this site may contact The Lunar and Planetary Institute by E-mail at <panel@lpi.jsc.nasa.gov> or by phone at (281) 486-2156 or -2166 for assistance . Hard copies of the proposals are to be delivered to:

ROSS-98 NASA Research Announcement
Planetary Geology and Geophysics Program
The Lunar and Planetary Institute
3600 Bay Area Boulevard
Houston, TX 77058
Phone number for commercial delivery: (713) 486-2166

Additional information may be obtained from Discipline Scientist:

Dr. Patricia G. Rogers
Research Program Management Division
Code SR
Office of Space Science
NASA Headquarters
Washington, DC 20546-0001
Telephone: (202) 358-0294
E-mail: patricia.rogers@hq.nasa.gov